



Some Information about Hierarchical Relationships Between Metadata Elements

↵ What are Hierarchies?

↵ Possible Hierarchical Relationships in PBCore

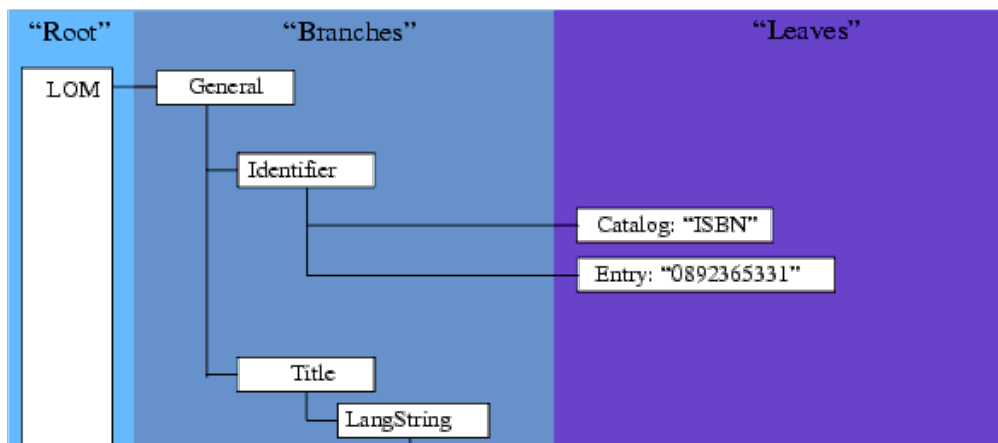
What are Hierarchies?

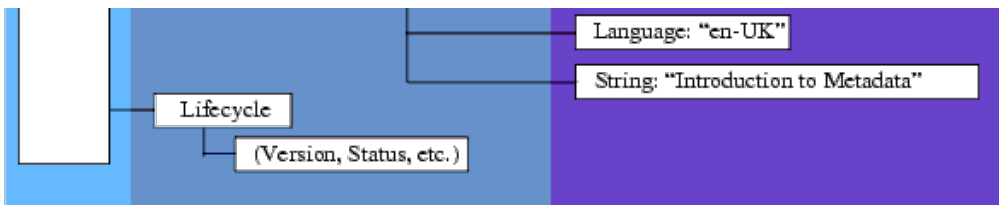
The Public Broadcasting Metadata Dictionary (PBCore) is:

- a core set of terms and descriptors (elements)...
- used to create information (metadata)...
- that categorizes or describes...
- media items (sometimes called assets or resources).

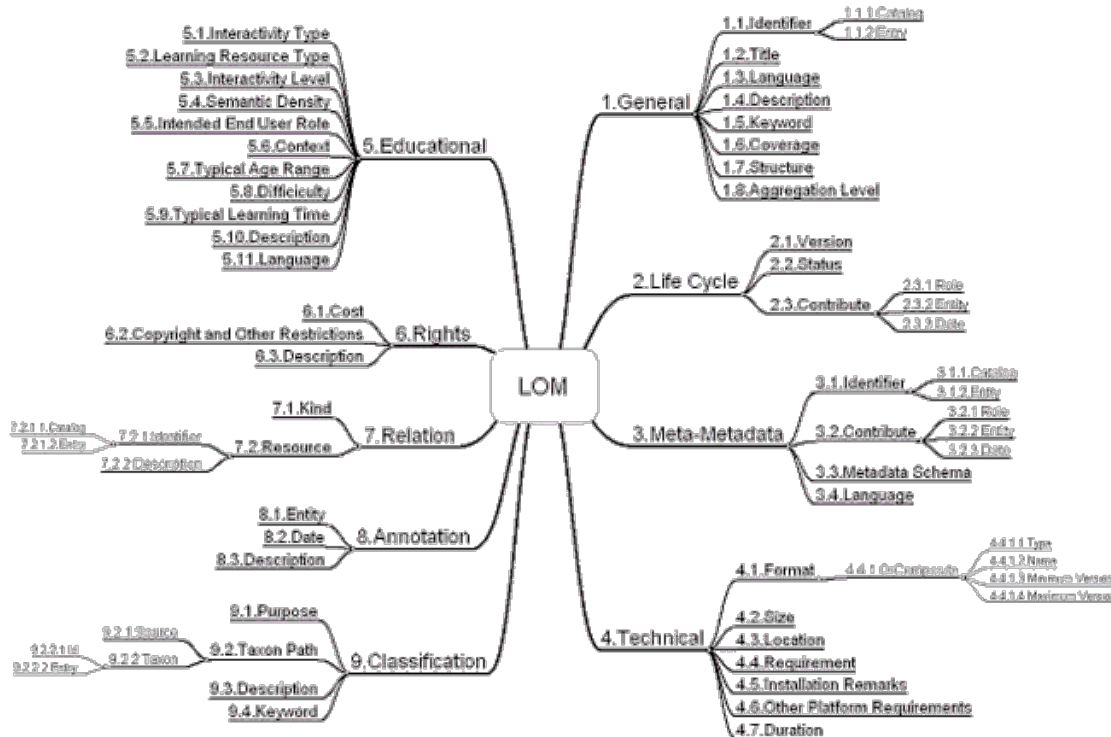
As a simple dictionary of elements, there is no "hierarchy" implied. They are presented in a "flat" arrangement as a listing of 48 descriptors from which you can pick and choose.

Some metadata models or schemas are based on a logical, hierarchical arrangement of their metadata elements, not only in the way they are conceptually presented, but also in how they are applied in actual metadata and asset management systems. For example, the **IEEE 1484.12.1-2002 Standard for Learning Object Metadata** is hierarchical. At the base of their hierarchy is a "**root**" element. The root element contains many sub-elements. If a sub-element itself contains additional sub-elements it is called a "**branch**." Sub-elements that do not contain any sub-elements are called "**leaves**." This entire hierarchical model is called a "**tree structure**." The relationship between the root, branches, and leaves is depicted in the figure below (taken from IEEE LOM and the **IMS Global Learning Consortium**), using sample elements from the IEEE LOM metadata standard.





The IEEE LOM metadata standard can be represented textually using an outline form with tabs and indented sub-tabs. Likewise, when the IEEE LOM metadata standard is expressed graphically, the following categories, branches and leaves appear as they do in this illustration:



This hierarchy is honored throughout the application of the metadata elements in any profile or management situation.

The PBMD Project has spent over two years comparing and contrasting various metadata descriptors, dictionaries, and schemes in order to arrive at the smallest set of elements that could adequately describe the media items produced by Public Broadcasting radio and television stations that may be shared between stations, regional and national distributors, independent producers, and even vendors of Digital Asset Management systems.

The PBCore is a "core" because it can actually be considered a foundation of descriptors used to categorize media items adequately enough so other interested parties can successfully search for and review desired media items. The objective is to be able to share media items and give users complete, well-thought-out, descriptions. Good descriptions help end users know what to expect when they decide to review, play or download a media file.

As a dictionary, the PBCore implies no hierarchical relationships (root, branches, leaves). However, in the realtor application of the PBCore metadata elements in any profile or management situation, hierarchical relationships can be applied to related and companion elements.

Possible Hierarchical Relationships in PBCore

Currently we have 48 main Elements and Sub-Elements. A sub-element is a companion descriptor closely associated with a main element, e.g., **publisher** is a main element and **publisherRole** is a companion or associated sub-element. **title** is a main element and **titleType** is a companion or associated sub-element.

We have gathered the PBCore Elements into three categories. Each category houses elements of a similar nature...

CONTENT...

13 elements describing the actual intellectual content of a media asset or resource.

INTELLECTUAL PROPERTY...

7 elements related to the creation, creators and usage of a media asset or resource.

INSTANTIATION...

28 elements that identify the technical nature of the media asset as it exists in some form or format.

The **Dublin Core Metadata Initiative** (DCMI) has generated a metadata scheme with 15 simple, core, unqualified elements or descriptors. They are presented in a "flat" form without hierarchical layers. Additional elements have been spawned in DCMI. These sub-elements follow a strict set of guidelines in how they are created and how they are to be used, e.g., a sub-element should further define the description for a media item in a more granular manner, but not change, extend, or stray from the underlying meaning of the parent element.

After much debate, PBCore has evolved to include DCMI-like structure to its metadata elements. However, at the same time (in the interest of simplification and reducing the number of core elements) some metadata elements can and probably should be applied in real-world management situations in a hierarchical or tree structure.

For example, from the Instantiation-related elements in PBCore, there are a handful of elements that begin with the word "format." Some of these elements are relevant only to audio media items, some to image and moving image media items. The "format" elements, if crafted in a flat manner, would have existed, redundantly, as in the following chart:

A FLAT ARRANGEMENT OF PBCORE ELEMENTS

audio media types

formatAudioGenerations
formatAudioStandard
formatAudioEncoding
formatAudioFileSize
formatAudioTimeStart
formatAudioDuration
formatAudioDataRate
formatAudioBitDepth
formatAudioSamplingRate

video media types

formatVideoGenerations
formatVideoStandard
formatVideoEncoding
formatVideoFileSize
formatVideoTimeStart
formatVideoDuration
formatVideoDataRate
formatVideoBitDepth
formatVideoFrameSize

	formatVideoAspectRatio
	formatVideoColors
still image media types	formatImageGenerations
	formatImageStandard
	formatImageEncoding
	formatImageFileSize
	formatImageBitDepth
	formatImageFrameSize
	formatImageColors

In contrast, if the "format" elements are collapsed (as they currently are in the PBCore v1.0) to express basic format concepts, and are then applied selectively and intelligently to various media types, hierarchical relationships emerge. These relationships can be expressed in the actual application of the PBCore, depending on the databases, systems, and manner in which the PBCore elements are exploited. Below is an example of a hierarchy using a textual, tabular format.

A HIERARCHICAL ARRANGEMENT OF PBCORE ELEMENTS

formatMediaType

> Audio

- formatGenerations
- formatStandard
- formatEncoding
- formatFileSize
- formatTimeStart
- formatDuration
- formatDataRate
- formatBitDepth
- formatSamplingRate

> Moving Image

- formatGenerations
- formatStandard
- formatEncoding
- formatFileSize
- formatTimeStart
- formatDuration
- formatDataRate
- formatBitDepth
- formatFrameSize
- formatAspectRatio
- formatColors

> Static Image

- formatGenerations
- formatStandard

- formatEncoding
 - formatFileSize
 - formatBitDepth
 - formatFrameSize
 - formatColors
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